

We claim:

1. A lung homing peptide having the amino acid sequence:

X_1 -G-F-E- X_2 (SEQ ID NO: 17)

5 wherein X_1 and X_2 each is 1 to 10
independently selected amino acids.

2. The lung homing peptide of claim 1,
which is selected from the group consisting of
CGFECVRQCPERC (SEQ ID NO: 1) and CGFELETC (SEQ ID
10 NO: 2).

3. A lung homing peptide selected from the
group consisting of CTLRDRNC (SEQ ID NO: 15) and
CIGEVEVC (SEQ ID NO: 16).

4. A lung homing peptide selected from the
15 group consisting of CLAKENVVC (SEQ ID NO: 13),
CVGNLSMC (SEQ ID NO: 37), CKGQRDFC (SEQ ID NO: 39),
CNMGLTRC (SEQ ID NO: 41), CHEGYLTC (SEQ ID NO: 42),
CLRPYLNC (SEQ ID NO: 45), CMELSKQC (SEQ ID NO: 47),
CLFSDENC (SEQ ID NO: 52), CWRGDRKIC (SEQ ID NO: 56),
20 CMSWDAVSC (SEQ ID NO: 64), CKWSRLHSC (SEQ ID NO: 65),
CTVNEAYKTRMC (SEQ ID NO: 75), CRLRSYGTLSLC (SEQ ID
NO: 76), CRPWHNQAHTC (SEQ ID NO: 82), CSEAASRMIGVC
(SEQ ID NO: 84), CWEEHPSIKWWC (SEQ ID NO: 85),
CGVGCPGLCGGAC (SEQ ID NO: 104) and CGGACGGVCTGGC (SEQ
25 ID NO: 114).

5. A conjugate, comprising the lung homing
molecule of claim 1, claim 2, claim 3 or claim 4
linked to a moiety.

6. The conjugate of claim 5, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

7. A method of identifying lung,
5 comprising the steps of:

a) contacting a tissue or organ with a lung homing peptide of claim 1, claim 2, claim 3 or claim 4; and

10 b) detecting binding of said lung homing peptide to said organ or tissue, thereby identifying the organ or tissue as lung.

8. A method of identifying a target molecule expressed by lung, comprising the method of
15 claim 7, further comprising the steps of:

c) obtaining a sample of said lung;
and

d) identifying the target molecule, which is bound by said lung homing peptide.

20 9. A method of treating a lung pathology in a subject, comprising administering a lung homing peptide of claim 1, claim 2, claim 3 or claim 4 to the subject, wherein said lung homing peptide selectively homes to lung, thereby treating the lung
25 pathology.

10. A peptide that selectively homes to the vasculature of the skin.

11. The peptide of claim 10, having the amino acid sequence CVALCREACGEGC (SEQ ID NO: 3).

12. The peptide of claim 10, which is selected from the group consisting of CWNICPGGCRA LC
5 (SEQ ID NO: 175), CKGTCVLGCSEEC (SEQ ID NO: 177),
CSSGCSKNCLEMC (SEQ ID NO: 181), CAVRCDGSCVPEC (SEQ ID
NO: 184) and CGGGCQWGCAGEC (SEQ ID NO: 191).

13. A conjugate, comprising the peptide of claim 10 linked to a moiety.

10 14. The conjugate of claim 13, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

15. A method of identifying skin, comprising the steps of:

15 a) contacting a tissue or organ with a peptide of claim 10; and

b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as skin.

20 16. A method of identifying a target molecule expressed by skin, comprising the method of claim 15, further comprising the steps of:

c) obtaining a sample of said skin; and

25 d) identifying the target molecule, which is bound by said peptide.

17. A method of treating a skin pathology in a subject, comprising administering a peptide of claim 10 to the subject, wherein said peptide selectively homes to skin, thereby treating the skin pathology.

18. A peptide that selectively homes to the vasculature of the retina.

19. The peptide of claim 18, having the amino acid sequence:

10 X_1 -R-D-V- X_2 (SEQ ID NO: 32)

wherein X_1 and X_2 each is 1 to 10 independently selected amino acids.

20. The peptide of claim 19, which is selected from the group consisting of CSCFRDVCC (SEQ ID NO: 5) and CRDVVSVIC (SEQ ID NO: 6).

21. The peptide of claim 18, which is selected from the group consisting of CGEFKVGVC (SEQ ID NO: 14), CMDSQSSC (SEQ ID NO: 228), CNQRTNRESGNC (SEQ ID NO: 231), CLLNYTYC (SEQ ID NO: 238), CQASASDHC (SEQ ID NO: 242), CVTSNLRVC (SEQ ID NO: 250) and CRARIRAEDISC (SEQ ID NO: 263).

22. A conjugate, comprising the peptide of claim 18 linked to a moiety.

23. The conjugate of claim 22, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

24. A method of identifying retina,
comprising the steps of:

a) contacting a tissue or organ with a
peptide of claim 18; and

5 b) detecting binding of said peptide
to said organ or tissue, thereby
identifying the organ or tissue as retina.

25. A method of identifying a target
molecule expressed by retina, comprising the method
10 of claim 24, further comprising the steps of:

c) obtaining a sample of said retina;
and

d) identifying the target molecule,
which is bound by said peptide.

15 26. A method of treating a retina
pathology in a subject, comprising administering a
peptide of claim 18 to the subject, wherein said
peptide selectively homes to retina, thereby treating
the retina pathology.

20 27. A peptide that selectively homes to
the vasculature of the pancreas.

28. The peptide of claim 27, having the
amino acid sequence SWCEPGWCR (SEQ ID NO: 4).

25 29. The peptide of claim 27, having the
amino acid sequence GLCNGATCM (SEQ ID NO: 123).

30. A conjugate, comprising the peptide of claim 27 linked to a moiety.

31. The conjugate of claim 30, wherein said moiety is selected from the group consisting of
5 a therapeutic agent, a detectable agent and a tag.

32. A method of identifying pancreas, comprising the steps of:

a) contacting a tissue or organ with a peptide of claim 27; and

10 b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as pancreas.

33. A method of identifying a target
15 molecule expressed by pancreas, comprising the method of claim 32, further comprising the steps of:

c) obtaining a sample of said pancreas; and

20 d) identifying the target molecule, which is bound by said peptide.

34. A method of treating a pancreas pathology in a subject, comprising administering a peptide of claim 27 to the subject, wherein said peptide selectively homes to pancreas, thereby
25 treating the pancreas pathology.

35. A peptide that selectively homes to the vasculature of the gut.

36. The peptide of claim 35, having the amino acid sequence:

5 Y-S-G-K-W-X₁ (SEQ ID NO: 433)

wherein X₁ is 1 to 10 independently selected amino acids.

37. The peptide of claim 36, which is selected from the group consisting of YSGKWGG (SEQ ID
10 NO: 9) and YSGKWGW (SEQ ID NO: 156).

38. The peptide of claim 35, having the amino acid sequence:

X₁-R-G-S-X₂ (SEQ ID NO: 434)

wherein X₁ and X₂ each is 1 to 10
15 independently selected amino acids.

39. The peptide of claim 38, which is selected from the group consisting of VRRGSPG (SEQ ID NO: 164), GGRGSWE (SEQ ID NO: 167) and FRVRGSP (SEQ ID NO: 169).

20 40. The peptide of claim 35, having an amino acid sequence selected from the group consisting of YAGFFLV (SEQ ID NO: 150), SRRQPLS (SEQ ID NO: 153), MSPQLAT (SEQ ID NO: 159), WIEEAER (SEQ ID NO: 161) and GISAVLS (SEQ ID NO: 166).

41. A conjugate, comprising the peptide of claim 35 linked to a moiety.

42. The conjugate of claim 41, wherein said moiety is selected from the group consisting of
5 a therapeutic agent, a detectable agent and a tag.

43. A method of identifying gut, comprising the steps of:

a) contacting a tissue or organ with a peptide of claim 35; and

10 b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as gut.

44. A method of identifying a target molecule expressed by gut, comprising the method of
15 claim 43, further comprising the steps of:

c) obtaining a sample of said gut; and

d) identifying the target molecule, which is bound by said peptide.

45. A method of treating a gut pathology
20 in a subject, comprising administering a peptide of claim 35 to the subject, wherein said peptide selectively homes to gut, thereby treating the gut pathology.

46. A peptide that selectively homes to
25 the vasculature of the prostate.

47. The peptide of claim 46, which is selected from the group consisting of SMSIARL (SEQ ID NO: 21), VSFLEYR (SEQ ID NO: 22) and RGRWLAL (SEQ ID NO: 279).

5 48. A conjugate, comprising the peptide of claim 46 linked to a moiety.

49. The conjugate of claim 48, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

10 50. A method of identifying prostate, comprising the steps of:

a) contacting a tissue or organ with a peptide of claim 46; and

15 b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as prostate.

51. A method of identifying a target molecule expressed by prostate, comprising the method
20 of claim 50, further comprising the steps of:

c) obtaining a sample of said prostate; and

d) identifying the target molecule, which is bound by said peptide.

25 52. A method of treating a prostate pathology in a subject, comprising administering a

peptide of claim 46 to the subject, wherein said peptide selectively homes to prostate, thereby treating the prostate pathology.

53. A peptide that selectively homes to
5 the vasculature of the ovary.

54. The peptide of claim 53, which is selected from the group consisting of EVRSRLS (SEQ ID NO: 10) and RVGLVAR (SEQ ID NO: 11).

55. A conjugate, comprising the peptide of
10 claim 53 linked to a moiety.

56. The conjugate of claim 55, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

57. A method of identifying ovary,
15 comprising the steps of:

a) contacting a tissue or organ with a peptide of claim 53; and

b) detecting binding of said peptide
to said organ or tissue, thereby
20 identifying the organ or tissue as ovary.

58. A method of identifying a target molecule expressed by ovary, comprising the method of claim 57, further comprising the steps of:

c) obtaining a sample of said ovary;
25 and

d) identifying the target molecule,
which is bound by said peptide.

59. A method of treating an ovary
pathology in a subject, comprising administering a
5 peptide of claim 53 to the subject, wherein said
peptide selectively homes to ovary, thereby treating
the ovary pathology.

60. A peptide that selectively homes to
the vasculature of the adrenal gland.

10 61. The peptide of claim 60, having the
amino acid sequence:

X_1 -L-P-R- X_2 (SEQ ID NO: 431)

wherein X_1 and X_2 each is 1 to 10
independently selected amino acids.

15 62. The peptide of claim 61, which is
selected from the group consisting of LMLPRAD (SEQ ID
NO: 27) and LPRYLLS (SEQ ID NO: 28).

63. The peptide of claim 60, having the
amino acid sequence:

20 X_1 -L-A-G-G- X_2 (SEQ ID NO: 432)

wherein X_1 is 1 to 10 independently
selected amino acids wherein X_2 is 0 to 10
independently selected amino acids.

64. The peptide of claim 63, which is selected from the group consisting of R(Y/F)LLAGG (SEQ ID NO: 404) and RYPLAGG (SEQ ID NO: 389).

5 65. The peptide of claim 60, which is selected from the group consisting of FSDVHFW (SEQ ID NO: 381) and GYVAVMT (SEQ ID NO: 400).

66. A conjugate, comprising the peptide of claim 60 linked to a moiety.

10 67. The conjugate of claim 66, wherein said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

68. A method of identifying adrenal gland, comprising the steps of:

15 a) contacting a tissue or organ with a peptide of claim 60; and

b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as adrenal gland.

20 69. A method of identifying a target molecule expressed by adrenal gland, comprising the method of claim 68, further comprising the steps of:

c) obtaining a sample of said adrenal gland; and

25 d) identifying the target molecule, which is bound by said peptide.

70. A method of treating a adrenal gland pathology in a subject, comprising administering a peptide of claim 60 to the subject, wherein said peptide selectively homes to adrenal gland, thereby
5 treating the adrenal gland pathology.

71. A peptide that selectively homes to the vasculature of the liver.

72. The peptide of claim 71, which is selected from the group consisting of VKSVCRT (SEQ ID
10 NO: 12), SRRFVGG (SEQ ID NO: 406), VGSFIYS (SEQ ID NO: 411) and WRQNMPL (SEQ ID NO: 418).

73. A conjugate, comprising the peptide of claim 70 linked to a moiety.

74. The conjugate of claim 73, wherein
15 said moiety is selected from the group consisting of a therapeutic agent, a detectable agent and a tag.

75. A method of identifying liver, comprising the steps of:

a) contacting a tissue or organ with a
20 peptide of claim 70; and

b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as liver.

76. A method of identifying a target
25 molecule expressed by liver, comprising the method of claim 75, further comprising the steps of:

c) obtaining a sample of said liver;
and

d) identifying the target molecule,
which is bound by said peptide.

5 77. A method of treating a liver pathology
in a subject, comprising administering a peptide of
claim 70 to the subject, wherein said peptide
selectively homes to liver, thereby treating the
liver pathology.

10 78. A lymph node homing peptide selected
from the group consisting of AGCSVTVCG (SEQ ID
NO: 315), GSCSMFPCS (SEQ ID NO: 317), SECAYRACS (SEQ
ID NO: 319), WSCARPLCG (SEQ ID NO: 320), GLCQIDECR
(SEQ ID NO: 329), DRCLDIWCL (SEQ ID NO: 331),
15 PLCMATRCA (SEQ ID NO: 333), RDCSHRSCE (SEQ ID
NO: 334), NPCLRAACI (SEQ ID NO: 335), PTCAYGWCA (SEQ
ID NO: 336), LECVANLCT (SEQ ID NO: 337), RKCGEVCT
(SEQ ID NO: 338), EPCTWNAEL (SEQ ID NO: 339) and
QQCQDPYCL (SEQ ID NO: 344).

20 79. A conjugate, comprising the peptide of
claim 78 linked to a moiety.

80. The conjugate of claim 79, wherein
said moiety is selected from the group consisting of
a therapeutic agent, a detectable agent and a tag.

25 81. A method of identifying lymph node,
comprising the steps of:

a) contacting a tissue or organ with a
peptide of claim 78; and

b) detecting binding of said peptide to said organ or tissue, thereby identifying the organ or tissue as lymph node.

5 82. A method of identifying a target molecule expressed by lymph node, comprising the method of claim 81, further comprising the steps of:

c) obtaining a sample of said lymph node; and

10 d) identifying the target molecule, which is bound by said peptide.

 83. A method of treating a lymph node pathology in a subject, comprising administering a peptide of claim 78 to the subject, wherein said
15 peptide selectively homes to lymph node, thereby treating the lymph node pathology.